

Education Quality and Accountability Office  
**EQAO**

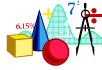
## Dufferin-Peel CDSB

November 10<sup>th</sup>, 2009

**Sandy DiLena**  
Content Lead Mathematics

**Amy Gilchrist**  
Education Officer Grade 9

**EQAO Assessments:  
Grade 9 Mathematics  
&  
Range-Finding**



## Agenda

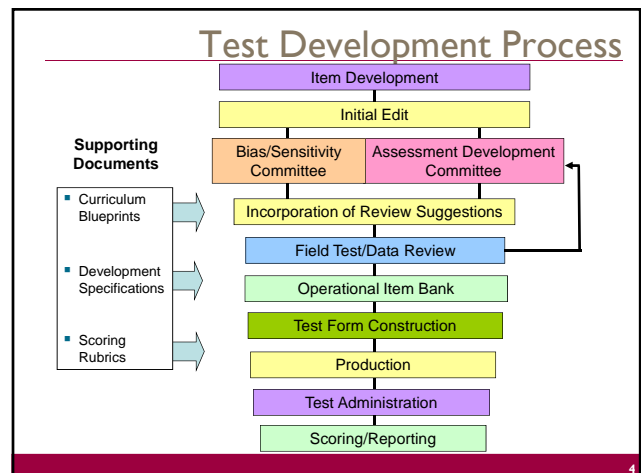
- Welcome and Introduction
- Grade 9 EQAO Assessments
  - Break 10:00 a.m. – 10:15 a.m.
- Introduction to Range-Finding
  - Lunch 11:30 p.m. – 12:15 p.m.
- Range Finding Activity
  - Break 2:00 p.m. – 2:15 p.m.
- Sharing of Results from Range-Finding Activity
- Conclusion

2

## EQAO's Mandate

- To provide accurate and valid data about student performance in designated subjects
- To educational stakeholders (parents, students, schools, boards and the government)
- To inform classroom instruction and to improve student achievement.

3



## Test Development Process

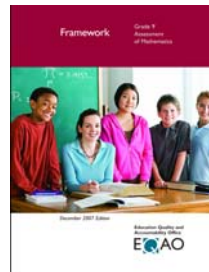
All questions  
(items) are  
developed by  
Ontario teachers



5

## Linking EQAO Data to *The Ontario Curriculum*

### Framework Documents:



### The assessment frameworks:

■ Provide a detailed description of the assessments':

- Purpose and benefits
- Large scale vs. classroom
- What is reported
- Make-up of assessments
- Curriculum connections
- Description of scoring
- Comparability

## Large-Scale Assessment:

### A Value-Added Resource

#### Large-Scale Assessment

Another lens to enhance student achievement data analysis



#### Classroom Assessment

The richest source of student achievement data



7

## Large-Scale Assessment:

### A Value-Added Resource

#### Serving Different Purposes

#### Large-Scale Assessment

Purpose – to provide comparable year-to-year data

Data informs improvement planning and target setting

Created and scored "at a distance"

Presents a snapshot of student achievement (summative)

Administered, scored and reported in a consistent and standard manner

Provides the same items for all students

#### Classroom Assessment

Purpose - to reports regularly on student achievement

Data provides students with info for self-evaluation and goal setting

Created and marked by the classroom teacher

Administered at regular intervals over time (diagnostic, formative, summative)

Involves a variety of supports, variation in administration procedures and time allowed, and teacher autonomy in marking

Allows for modified items and tasks tailored to needs of individual or groups of students

8



## How Do the Assessments Align with *The Ontario Curriculum*?

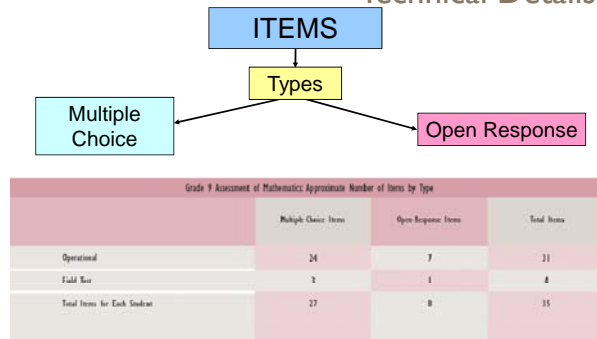
**EQAO's assessments are large-scale standards-referenced assessments:**

- The assessments for the Primary and Junior divisions and grade 9 are based on the *Ontario Curriculum* expectations and the Ministry of Education's levels of achievement for student performance
- The OSSLT is based on the *Ontario Curriculum* expectations requiring reading and writing across all subjects to the end of grade 9

## Purpose of the Grade 9 Mathematics Assessments?

- To assess students and report yearly data on the level at which students are meeting curriculum expectations in the grade 9 Academic and Applied Mathematics courses.
- To report for individuals, schools, boards and the province.

## Grade 9 Assessments of Mathematics Technical Details



## Linking EQAO Data to *The Ontario Curriculum*

**EQAO Blueprint**



**What Does the Assessment Blueprint Look Like?**

## Sample from the Grade 9 Applied Blueprint

Number	Grade 9 Applied Mathematics Expectations	MC Total = 24 OR Total = 7	Raw Score Points
NA1.02	<b>Number Sense and Algebra, Overall Expectation 2</b> simplify numerical and polynomial expressions in one variable, and solve simple first-degree equations		
	<b>Number Sense and Algebra, Specific Expectations for Overall 2: Simplifying Expressions and Solving Equations</b>		
NA2.01	simplify numerical expressions involving integers and rational numbers, with and without the use of technology		
NA2.02	relate their understanding of inverse operations to squaring and taking the square root, and apply inverse operations to simplify expressions and solve equations		
NA2.03	describe the relationship between the algebraic and geometric representations of a single-variable term up to degree three (i.e., length, which is one dimensional, can be represented by $x$ ; area, which is two dimensional, can be represented by $x^2$ ; or volume, which is three dimensional, can be represented by $x(x)(x)$ , $(x^3)/6$ , or $x^3$ )	3 MC	3 x 1 = 3
NA2.04	substitute into and evaluate algebraic expressions involving exponents (i.e., evaluate expressions involving natural-number exponents with rational-number bases (e.g., evaluate $(\frac{1}{2})^3$ by hand and $8.9^3$ by using a calculator)) (Sample problem: A movie theatre wants to compare the volumes of popcorn in two containers, a cube with edge length 8.1 cm and a cylinder with radius 4.5 cm and height 8.0 cm. Which container holds more popcorn?)	1 OR	1 x 4 = 4 score points or 13% of total score
NA2.05	add and subtract polynomials involving the same variable up to degree three (e.g., $(2x + 1) + (x^2 - 3x + 4)$ ), using a variety of tools (e.g., algebra tiles, computer algebra systems, paper and pencil)		
NA2.06	multiply a polynomial by a monomial involving the same variable to give results up to degree three (e.g., $(3x + 2)(x + 1)$ ), using a variety of tools (e.g., algebra tiles, drawings, computer algebra systems, paper and pencil)		
NA2.07	solve first-degree equations with nonfractional coefficients, using a variety of tools (e.g., computer algebra systems, paper and pencil) and strategies (e.g., the balance analogy, algebraic strategies) (Sample problem: Solve $2x + 7 = 6x - 1$ using the balance analogy)		
NA2.08	substitute into algebraic equations and solve for one variable in the first degree (e.g., in relationships, in measurements) (Sample problem: The perimeter of a rectangle can be represented as $P = 2l + 2w$ . If the perimeter of a rectangle is 58 cm and the width is 11 cm, determine the length.)		

13

## Linking EQAO Data to The Ontario Curriculum

### A blueprint is used:

- To develop each year's assessment so that the assessments always have the same characteristics
- To map each multiple-choice and open-response question on the assessment to individual expectations or groups of curriculum expectations
- To identify which questions will be used to distinguish performances at each of the levels of achievement.

14

## Are There Separate Questions for Every Expectation?

Questions are allocated to clusters of expectations on the blueprint.

Questions are developed to address a specific expectation within the cluster.

From year to year, different expectations are addressed from the cluster.

15



## Italicized Expectations

Expectations in *italics* cannot be appropriately assessed on a large scale assessment.

Students will:

LR2.01 construct tables of values, graphs, and equations, *using a variety of tools* (e.g., graphing calculators, spreadsheets, graphing software, paper and pencil), to represent linear relations derived from descriptions of realistic situations (Sample problem: Construct a table of values, a graph, and an equation to represent a monthly cellphone plan that costs \$25, plus \$0.10 per minute of airtime.)

LR1.03 *design and carry out an investigation or experiment involving relationships between two variables, including the collection and organization of data, using appropriate methods, equipment, and/or technology (e.g., surveying; using measuring tools, scientific probes, the Internet) and techniques (e.g., making tables, drawing graphs)* (Sample problem: Design and perform an experiment to measure and record the temperature of ice water in a plastic cup and ice water in a thermal mug over a 30 min period, for the purpose of comparison. What factors might affect the outcome of this experiment? How could you design the experiment to account for them?)

## Levels of Difficulty and MC

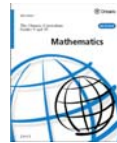
**Multiple-choice questions are developed and used to distinguish performance levels.**

- Easy: distinguish between Level 1 and 2 performances.
- Medium: distinguish between Level 2 and 3 performances.
- Challenging: distinguish between Level 3 and 4 performances.

## The Achievement Chart provides:

descriptions of four categories of knowledge and skills

- Knowledge and Understanding
- Thinking
- Communication
- Application



## Knowledge and Understanding - KU

These items require students to demonstrate:

- subject specific content (knowledge)
- the comprehension of its meaning and significance (understanding)



e.g. use the Pythagorean Theorem to find the length of the missing side.

## Thinking - PS

These items require students to:

- select and sequence a variety of tools to solve a problem
- demonstrate a critical-thinking process.

To answer the question, students need to make a plan.



## Application - AP

These items require students to:

- select the appropriate “tool” or get the necessary information
- “fit” it to the problem.

E.g. Determine the amount of soup the cylindrical can contains.



## What's the difference between KU and AP?

If you tell the student what procedure to perform then the skill is usually **KU**.

If the student must decide what procedure to perform then the skill is usually **AP**.

In **AP**, the context is integral to the item.

## What's the difference between PS and AP?

Anything to do with the problem-solving process is Thinking (**PS**).

The selection and fitting of a single mathematical tool is Application (**AP**).

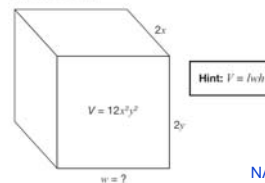
If the student needs to make a plan, then the item is Thinking (PS).

## Name the Category

Multiple-Choice Example

Academic Spring 2009

A box with a volume of  $12x^3y^2$  is shown below.



Hint:  $V = lwh$

What is the width of the box?

F  $2xy$

G  $3xy$

H  $4x^3y^3$

J  $8x^3y^3$

NA1.03

derive, through the investigation and examination of patterns, the exponent rules for multiplying and dividing monomials, and apply these rules in expressions involving one and two variables with positive exponents

## Name the Category

Multiple-Choice Example  
Academic Winter 2009

What is the value of  $(x^2)^3$  when  $x = \frac{1}{2}$ ?

- F  $\frac{1}{4}$
- G  $\frac{1}{12}$
- H  $\frac{1}{32}$
- J  $\frac{1}{64}$

NA 1.01  
substitute into and  
evaluate algebraic  
expressions involving  
exponents (i.e., evaluate  
expressions involving  
natural-number exponents  
with rational-number bases  
[e.g., evaluate  $(3/2)^3$  by  
hand and 9.83 by using a  
calculator])

25



## Name the Category

Multiple-Choice Example  
Academic Spring 2008

Gerry has a table of values representing a linear relation. Two of the numbers are hidden behind a ketchup spill.

x	y
-2	-6
-1	
0	
1	18

The values that are hidden are

- a -2 and 14.
- b 0 and 12.
- c 2 and 10.
- d 3 and 9.

LR2.02  
identify, through  
investigation, some  
properties of linear relations  
(i.e., numerically, the first  
difference is a constant,  
which represents a constant  
rate of change; graphically,  
a straight line represents the  
relation), and apply these  
properties to determine  
whether a relation is linear  
or non-linear

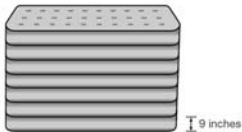


## Scoring Open-Response

Applied Spring 2009

### Stacked High

A mattress company has 7000 mattresses to sell. The company claims that if all the mattresses are stacked on top of each other, the stack will be 3 times the height of the CN Tower.



Hint:

1 inch = 2.5 cm  
1 m = 100 cm

The height of the CN Tower is 553 m and each mattress is 9 inches high. Is the company's claim true?

Justify your answer.

27

## 4 CODES OF PERFORMANCE

40

30

20

10

## Levels of Achievement

Level 4: thorough/high degree

Level 3: considerable

Level 2: some

Level 1: limited



## Generic Rubric: Mathematics Open-Response Items

Code	Descriptor
10	<ul style="list-style-type: none"> <li>demonstration of limited understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows limited effectiveness due to                             <ul style="list-style-type: none"> <li>misunderstanding of concepts</li> <li>incorrect selection or misuse of procedures</li> </ul> </li> <li>problem-solving process shows limited effectiveness due to                             <ul style="list-style-type: none"> <li>minimal evidence of a solution process</li> <li>limited identification of important elements of the problem</li> <li>too much emphasis on unimportant elements of the problem</li> <li>no conclusions presented</li> <li>conclusion presented without supporting evidence</li> </ul> </li> </ul>
20	<ul style="list-style-type: none"> <li>demonstration of some understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows some effectiveness due to                             <ul style="list-style-type: none"> <li>partial understanding of the concepts</li> <li>errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows some effectiveness due to an incomplete solution process                             <ul style="list-style-type: none"> <li>identification of some of the important elements of the problem</li> <li>some understanding of the relationships between important elements of the problem</li> <li>simple conclusions with little supporting evidence</li> </ul> </li> </ul>
30	<ul style="list-style-type: none"> <li>demonstration of considerable understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows considerable effectiveness due to                             <ul style="list-style-type: none"> <li>an understanding of most of the concepts in spite of minor errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows considerable effectiveness due to                             <ul style="list-style-type: none"> <li>a solution process that is nearly complete</li> <li>identification of most of the important elements of the problem</li> <li>a considerable understanding of the relationships between important elements of the problem</li> <li>appropriate conclusions with supporting evidence</li> </ul> </li> </ul>

## Generic Rubric: Mathematics

### Code 30

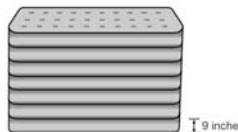
Code	Descriptor
30	<ul style="list-style-type: none"> <li>demonstration of <b>considerable</b> understanding of concepts and/or procedures</li> <li>application of knowledge and skills shows <b>considerable</b> effectiveness due to                             <ul style="list-style-type: none"> <li>an understanding of <b>most</b> of the concepts in spite of minor errors and/or omissions in the application of the procedures</li> </ul> </li> <li>problem-solving process shows <b>considerable</b> effectiveness due to                             <ul style="list-style-type: none"> <li>a solution process that is <b>nearly</b> complete</li> <li>identification of <b>most</b> of the important elements of the problem</li> <li>a <b>considerable</b> understanding of the relationships between important elements of the problem</li> <li>appropriate conclusions with supporting evidence</li> </ul> </li> </ul>

## Scoring Open-Response

Applied Spring 2009

### Stacked High

A mattress company has 7000 mattresses to sell. The company claims that if all the mattresses are stacked on top of each other, the stack will be 3 times the height of the CN Tower.



Hint:  
1 inch = 2.5 cm  
1 m = 100 cm

The height of the CN Tower is 553 m and each mattress is 9 inches high. Is the company's claim true?

Justify your answer.



## Grade 9 Assessment of Mathematics

Stacked High Item Specific Rubric

NA1.05 solve problems involving ratios, rates, and directly proportional relationships in various contexts

Code	Description
B	Blank; nothing written or drawn in response to the question
I	<ul style="list-style-type: none"> <li>Irrelevant: cannot be read; completely crossed out/erased; not written in English;</li> <li>Irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, "I", "I don't know");</li> <li>Off topic: no relationship of written work to the question.</li> </ul>
10	<p>Problem-solving process involving ratios and rates shows limited effectiveness due to</p> <ul style="list-style-type: none"> <li>minimal evidence of a solution process;</li> <li>limited identification of important elements of the problem;</li> <li>too much emphasis on unimportant elements of the problem;</li> <li>no conclusion presented or conclusion presented without supporting evidence.</li> </ul>
20	<p>Problem-solving process involving ratios and rates shows some effectiveness due to</p> <ul style="list-style-type: none"> <li>an incomplete solution process;</li> <li>identification of some of the important elements of the problem;</li> <li>some understanding of the relationships between important elements of the problem;</li> <li>simple conclusions with little supporting evidence.</li> </ul>
30	<p>Problem-solving process involving ratios and rates shows considerable effectiveness due to</p> <ul style="list-style-type: none"> <li>a solution process that is nearly complete;</li> <li>identification of most of the important elements of the problem;</li> <li>a considerable understanding of the relationships between important elements of the problem;</li> <li>appropriate conclusions with supporting evidence.</li> </ul>
40	<p>Problem-solving process involving ratios and rates shows a high degree of effectiveness due to</p> <ul style="list-style-type: none"> <li>a complete solution process;</li> <li>identification of all important elements of the problem;</li> <li>a thorough understanding of the relationships between all of the important elements of the problem;</li> <li>appropriate conclusions with thorough and insightful supporting evidence.</li> </ul>

33

## Activity:

- Consider the 4 samples of student work shown on the handout.
- Label them in order from strongest (code 40) to weakest (code 10) performance.

34

## EQAO Website

www.eqao.com

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English | Français



With Learning in Mind

Axé sur l'apprentissage

35

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36

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## Educators

Assessment of Reading, Writing and Mathematics, Primary Division (Grades 1-3) and Junior Division (Grades 4-6)

The Assessments of Reading, Writing and Mathematics [Primary Division \(Grades 1-3\)](#) and [Junior Division \(Grades 4-6\)](#) are based on the reading, writing and mathematics expectations in The Ontario Curriculum, Grades 1-8. These assessments provide both individual and system data on student achievement.

**Grade 9 Assessment of Mathematics**

The [Grade 9](#) Assessment of Mathematics provides individual and system data on student knowledge and skills, based on the expectations for students in Grade 9 applied and academic programs in The Ontario Curriculum, Grades 9 and 10 Mathematics. All students in these programs are required to participate in the assessment.

Every student who writes the Grade 3 or Grade 6 Assessment of Reading, Writing and Mathematics, the Grade 9 Assessment of Mathematics or the OSBLT receives an Individual Student Report. EQAO also releases provincial, school board and school results.

Ontario Secondary School Literacy Test

The purpose of the [Ontario Secondary School Literacy Test \(OSSLT\)](#) is to ensure that students have acquired the essential reading and writing skills that apply to all subject areas in the provincial curriculum up to the end of Grade 9. All students in public and private schools who are working toward an Ontario Secondary School Diploma are required to write the OSSLT in Grade 10. Students who have been eligible to write the OSSLT at least twice and have been unsuccessful at least once are eligible to fulfil the requirement through the Ontario Secondary School Literacy Course (OSSLC). (Principals have the discretion to allow students to enrol in the course before they have a second opportunity to take the test, if the principal determines that it is in the best educational interests of the student (Ministry of Education Policy/Program Memorandum 127). Successful completion of the OSSLT or OSSLC is a graduation requirement.

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37

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Grade 9 Assessment of Mathematics

EQAO's Technical Report for the 2007-2008 Assessments

This report outlines the technical features and professional expertise that were used to ensure the accuracy, validity and psychometric integrity of the EQAO assessments administered in 2007-2008. EQAO's Technical Report for the 2007-2008 Assessments will be posted on the EQAO web site in the spring of 2009.

EQAO's Executive Summary of the Technical Report for the 2007-2008 Assessments  
[Download](#) pdf | 11 pages | 327K | Posted 02 04 09

2008-2009 Bulletin for Teachers

[Download](#) pdf | 2 pages | 59K | Posted 12 11 08

Administering the Grade 9 Assessments of Mathematics, Winter and Spring 2009

This guide has been developed to provide direction and information to principals and teachers administering the Grade 9 Assessment of Mathematics in winter or spring 2009. Administering the assessment according to the guidelines in this document will ensure province-wide consistency before, during and after the administration.

[Download](#) pdf | 17 pages | 252K | Posted 11 20 08

38

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Grade 9 Assessment of Mathematics

Summary of Results and Strategies for Teachers 2008-2009

The summary of results provides an overview of results at the provincial level as well as a comparison of results over time and strategies to assist teachers, parents and other education stakeholders in helping students develop and demonstrate their knowledge and skills in mathematics.

[Download](#) pdf | Posted 09 17 09

Sample Assessment Questions

Click the links to access sample assessment questions, student responses and scoring guides taken from past years' Grade 9 Assessment of Mathematics.

2008-2009 | 2007-2008 | 2006-2007 | 2005-2006 | 2004-2005 | 2003-2004 | 2002-2003 | 2001-2002 | 2000-2001

**Additional Tests** These tests have been used in a previous assessment. Teachers may use them as instructional tools or for classroom assessment with students in either applied or academic programs.

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39

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40

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## Careers and Educator Opportunities

Good Assessments. Good Information. Good for Students.

### EDUCATOR OPPORTUNITIES 2009 - 2010

Bring Your Expertise to EQAO's Assessment Committees and Scoring Activities.

Ontario educators with expertise in primary or junior language or mathematics, Grade 9 mathematics, Grade 10 literacy or cross-curricular equity principles are invited to apply for positions on EQAO assessment committees and for upcoming scoring opportunities.

To apply online for an educator scoring and/or committee opportunity you can [update your existing profile](#) or [create a profile](#) if you do not have one.

Assessment Committees		
Committees	Positions Available	Activity Date
Item-Writing		
OSSLT	12	October 21-22, 2009 January 5-7, 2010
Formative/Summative Questions (Mathematics)	12	October 27-28, 2009 January 28-29, 2010
Formative/Summative Questions (Language)	20	October 27-28, 2009 January 28-29, 2010
Grade 9	10	October 13-14, 2009 February 25-26, 2010

41

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42

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## Opportunities for Ontario Educators

### Job Description

Job Title: Item-Writing Committee Member

Assessment: Grade 9

Subject(s): Mathematics

Term: 1-3 years

Location: Greater Toronto Area

To Apply: Please see link below

A separate item-writing committee exists for each of the Grade 9 Assessment of Mathematics, the OSSLT, and the language and mathematics components of the Grades 3 and 5 assessments, in both English and French. Each committee has 10 to 15 members who serve for terms of approximately one to three years.

Members meet twice a year (for a maximum of two days per meeting) to develop assessment items to be considered for EQAO assessments.

### Role of Members

Members will

- develop assessment items on an as-needed basis for the EQAO assessment program and
- develop multiple-choice and open-response assessment items based on the expectations and achievement charts in The Ontario Curriculum that match the

43

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# Range-Finding

Purpose:

To engage Ontario Educators in preparing a high quality set of scoring tools and training materials for scorers.

To select materials that define and illustrate the range of performances within the codes of the rubric.

44

## Overview of Procedure:

1. Score Student Samples
2. Consensus score student samples in groups of 4
3. Select anchor papers
4. Write annotations

45

## Scoring Materials:

### Anchor Papers:

- student responses that illustrate the criteria on the rubric for each code
- The representative sample – a picture is worth 1000 words

46

## Generic Rubric: Mathematics Open Response Items

Generic Scoring Guide for Mathematics Grades 3, 6, 9	
Code B	Blank: nothing written or drawn in the space provided
Code U	<ul style="list-style-type: none"> <li>Illegible: cannot be read, completely crossed out / erased, not written in English</li> <li>Irrelevant content: does not attempt assigned question (e.g., comment on the task, drawings, "P", "I", "I don't know")</li> <li>Off topic: no relationship of written work to the question</li> </ul>
Code 10	<ul style="list-style-type: none"> <li>demonstrates limited understanding of mathematical concepts and/or procedures</li> <li>application of knowledge and skills shows limited effectiveness due to                             <ul style="list-style-type: none"> <li>demonstration of misunderstanding of concepts</li> <li>incorrect selection or misuse of procedures</li> </ul> </li> <li>problem-solving process shows limited effectiveness due to                             <ul style="list-style-type: none"> <li>limited evidence of a solution process</li> <li>limited identification of important elements of the problem</li> <li>too much emphasis on unimportant elements of the problem</li> <li>no conclusions presented</li> <li>conclusion presented without supporting evidence</li> </ul> </li> </ul>
Code 20	<ul style="list-style-type: none"> <li>demonstrates some understanding of mathematical concepts and/or procedures</li> <li>application of knowledge and skills shows some effectiveness due to                             <ul style="list-style-type: none"> <li>demonstration of some understanding of the underlying mathematical concepts</li> <li>errors in the application of the mathematical procedures</li> </ul> </li> <li>problem-solving process shows some effectiveness due to                             <ul style="list-style-type: none"> <li>a solution process that is incomplete</li> <li>identification of some of the important elements of the problem</li> <li>demonstration of some understanding of the relationships between important elements of the problem</li> </ul> </li> <li>simple conclusions with little supporting evidence</li> </ul>

47

## Code 40

- ☐ thorough, high degree
- ☐ a strong response
- ☐ does not have to be perfect
- ☐ fully answered
- ☐ concepts, applications and/or processes are accurate and clear

48

## Code 10

- ☐ limited, minimal
- ☐ an aspect related to question
- ☐ incorrect/inaccurate concepts
- ☐ procedures inaccurate/incorrect
- ☐ no supporting evidence

49

## Code 20

- ☐ some
- ☐ answers only part of question
- ☐ demonstrates partial understanding
- ☐ partially explained conclusions
- ☐ little supporting evidence

50

## Code 30

- ☐ considerable, nearly complete
- ☐ answers most of question
- ☐ contains minor errors/omissions
- ☐ lack of clarity

51

## Materials

- ☐ Booklet of ~ 30 samples of student work of mixed performances
- ☐ Item Specific Rubric
- ☐ Master Consensus Recording Sheet

52

## Detailed Procedure:

1. Score first 5 Student Samples (ON YOUR OWN).
2. Consensus score these student samples.
3. Repeat #1 and #2 with 10 samples until all 30 are scored.
4. Select anchor papers, one for each code.  
(You may want to pile the samples.)
5. Write descriptions of the attributes of your choice.
6. Review anchors for 4 progressive performances.

53

## Descriptions

Describe the attributes of the student work that resulted in the code it was given.

Try to generalize the code's attributes.

Use the language of the item specific rubric to describe the choice of code.

54

## Jobs

1. Consensus Scores Recorder
  - Records scores from all group members
  - Records reasons for consensus code
2. Tracker: Tracks anchors
3. Description Writer
4. Time Keeper

55